

REMARKS

Reconsideration of the present application is respectfully requested.

Claims 13-17 and 27-32 stand rejected under 35 USC §102(e) or 102(a) over Crofts et al. Claims 13-16 and 27-29 have been cancelled, thus rendering the rejections against those claims moot. With regard to claim 17, Applicants respectfully assert that the MPEP and relevant case law require that a reference disclose exactly what an Applicant has claimed in order to support a §102 rejection. In this case, all of the claims require a velocity control circuit. Crofts et al., on the other hand, fails to implicitly, inherently or explicitly teach a velocity control circuit, and a review of the Crofts et al. structure would show that a velocity control circuit would neither be applicable nor helpful to the Crofts et al. fuel injector. There should be no dispute that the Crofts et al. device shows a structure in which a nozzle needle valve member strikes an end surface of a piezo controlled valve member when the nozzle needle moves to its open position. Thus, the contact surface in Crofts et al. is clearly one end of the needle valve member contacting the end of another valve member. The Crofts et al. fuel injector has a nozzle needle valve that is controlled by a piezo actuated valve member, and the timing of the pilot piezo actuation verses the response of the nozzle needle is determined by the impact of the two valve members. Although the cited passage of Crofts et al. refers to rate shaping and the like, that is something other than valve member velocity, and instead relates purely to a fuel injection rate of liquid spray from Crofts et al. fuel injector. Thus, it is unfair to read Applicants' claimed velocity control circuit onto a rate of fuel injection spray from the Crofts et al. fuel injector. Furthermore, Crofts et al. provides no suggestion or incentive, and in fact it would be illogical, for the velocity of the impact of its two valve members to be pertinent to the injection timing and rate issues that are clearly of concern to Crofts et al. Therefore, because Crofts et al. flatly fails to show or suggest a velocity control circuit, Applicants respectfully request that all of the §102 rejections be withdrawn. Alternatively, if the Examiner believes that some minor amendment would better prevent Applicants' claimed velocity control circuit to be read onto liquid fuel spray rate from the Crofts et al. fuel injector, Applicants would welcome any such suggestion in order to advance the prosecution of this application.

Applicants also take issue with regard to the rejection of claim 32 as it specifically requires that the actuator control circuit slow the impact of the valve member. Since the nozzle

needle of Crofts et al. utilizes fluid pressure in opposition to a spring force to control its movement, and because the piezo electric actuator only controls connection to high or low pressure, it is not believed possible for the Crofts et al. device to provide any control signal to its piezo actuator that could in any way affect the impact velocity of its two valve members. There certainly should be no dispute that Crofts et al. fails to show or suggest how to do such a thing. Therefore, because §102 requires that the reference actually disclose what an Applicant has claimed, and because Crofts et al. does not do this, Applicants respectfully request that the outstanding rejection against claim 32 also be withdrawn.

Claims 33-35 stand rejected under 35 USC §103(a) over Crofts et al. in view of Irokawa et al. The text of the rejection also refers to Sims et al., thus Applicants respectfully request that the actual rejection be clarified or withdrawn. In any event, Applicants respectfully assert that due to the structure of the Crofts et al. device and how it works, it would be illogical to try to incorporate any feedback control feature of Irokawa and/or Sims in any type of attempt to control impact velocity and/or position control in the Crofts et al. device. Again, the Crofts et al. device works by a piezo control valve opening a valve seat to raise fuel pressure, which in turn acts upon the nozzle needle and causes it to lift to commence the spray of fuel out of the Crofts et al. fuel injector. The timing of the needle valve member's movement to an open position is determined due to its impact with the piezo controlled valve member. The timing of the nozzle opening could be adjusted by changing piezo actuation time, but that is different from Applicants' claims. But neither velocity control nor position control are pertinent to issues relating to start of injection timing, fuel injection rate or impact velocity in the Crofts et al. device. Thus, because the impact velocity and the position at which that impact occurs are completely unrelated to the control signal applied to the Crofts piezo controlled valve, it defies logic as to why one with ordinary skill in the art would be motivated to incorporate Irokawa et al. and/or Sims into the Crofts et al. device to somehow arrive at Applicants' claimed invention. Therefore, Applicants respectfully request that the §103 rejections be withdrawn, or that the record be expanded to reduce issues for appeal with regard to what logic would motivate one with ordinary skill in the art to even attempt the combination asserted in the office action, since it does not even appear possible with the specific structure taught by Crofts et al.

Claim 17 stands rejected on the ground of non-statutory obvious-type double patenting over claim 2 of U.S. Patent 6,285,115 in view of Crofts et al. In addition, claims 17-22 and 30-35

stand rejected on non-statutory obvious-type double patenting over claim 2 of U.S. Patent 6,285,115 in view of Crofts et al. and Irokawa et al. Although Applicants disagree, a terminal disclaimer and fee are included to obviate the double patenting rejection. Therefore, Applicants respectfully request that the outstanding obvious-type double patenting rejections be withdrawn. The Commissioner is authorized to charge any underpayment or credit any overpayment to deposit account number 500226.

This application is believed to be in condition for allowance of claims 17-22 and 30-35. However, if the Examiner believes that some minor additional clarification would put this application in even better condition for allowance, the Examiner is invited to contact the undersigned attorney at (812) 333-5355 in order to hasten the prosecution of this application.

Respectfully Submitted,

A handwritten signature in black ink, appearing to read 'MBL' followed by a stylized flourish.

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